

Claims 1-3 are rejected under 35 U.S.C. § 103 for obviousness predicated upon Tsushima et al., U.S. Patent No. 4,696,581 (hereinafter Tsushima), in view of Tipton et al., U.S. Patent No. 5,910,223 (hereinafter Tipton), and Kiuchi et al., U.S. Patent No. 6,101,710 (hereinafter Kiuchi)

On pages two through four of the Office Action, the Examiner asserted that the elemental constituents recited in claims 1-3 are disclosed by the applied prior art. This rejection is respectfully traversed.

As discussed in M.P.E.P. § 2141, one of the basic considerations for an Examiner is to consider the claimed invention as a whole.¹ In analyzing whether the claimed invention as a whole, the Examiner cannot consider the invention as only a collection of claimed parts (or constituents). Rather, an "invention as a whole" analysis also requires the Examiner to consider the claimed interactions between the claimed parts (or constituents).

Kiuchi describes in the Abstract that "[t]he use of the vacuum carburization enables carburization with the chromium (Cr) content being 3.0 weight % or more, and even up to 18 weight %, which was difficult to achieve with the conventional gas carburization (pre-oxidation + gas carburizing)." As is apparent from this description, it is the object of Kiuchi to have Cr at

¹When applying 35 U.S.C. § 103, the following tenets of patent law must be adhered to:

- (A) The claimed invention must be considered as a whole;
- (B) The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination;
- (C) The references must be viewed without the benefit of impermissible hindsight vision afforded by the claimed invention; and
- (D) Reasonable expectation of success is the standard with which obviousness is determined.

Hodosh v. Block Drug Co., Inc., 786 F.2d 1136, 1143 n.5, 229 USPQ 182, 187 n.5 (Fed. Cir. 1986).

a content even higher than the Cr content (0.3 mass % to 2.5 mass %) of the present invention. Therefore, one having ordinary skill in the art would not have been motivated to arrive at the claimed chromium content in view of Kiuchi, as Kiuchi teaches away from the limitation of Cr content to be 2.5 mass % or lower.

Furthermore, Kiuchi describes a method of carburization of a high alloy steel based on vacuum carburization. In Kiuchi, silicon content is as low as 1.5% by weight, and as previously discussed, the Cr content in Kiuchi is higher than the range for Cr defined in the present invention. Thus, concepts such as suppression of softening at a high temperature range and improvement of resistance to temper softening are not contemplated by Kiuchi.

Additionally, in column 5, lines 37-38, Tipton teaches that silicon is less than 0.10%. In contrast, claim 1 recites that the silicon content of the rolling bearing components is between 0.3% and 3.0%. Thus, a heat resistant bearing cannot be formed from the steel according to this reference.

Tsushima describes a cemented steel with a carbon content of 0.15 to 0.4%. Additionally, the roller bearing of Tsushima includes a surface hardened layer having a hardness not less than HRC 58. This hardened layer is made deeper, and the cleanness of materials is improved, so that even under lubricating conditions involving foreign matter, long life of the roller bearing is ensured. This reference, however, does not contemplate use of the material at a high temperature. Furthermore, although Tsushima relates to a bearing formed from cemented steel, Tsushima does not consider any alloy element used for high heat resistance.

Upon reviewing the teachings of Tipton, Kiuchi, and Tsushima, it is clear that both Tipton and Kiuchi teach away from the claimed invention. Furthermore, each of the three cited references do not contemplate a roller bearing material capable of withstanding high temperature in the same manner as the claimed roller bearing material. Therefore, Applicants respectfully submit that one having ordinary skill in the art would not have considered the claimed invention as a whole to be obvious within the meaning of 35 U.S.C. § 103. Thus, Applicants solicit the withdrawal of the imposed rejection of claims 1-3 under 35 U.S.C. § 103 for obviousness predicated upon Tsushima in view of Kiuchi and Tipton.

With regard to the second full paragraph on page 3 of the Office Action, the Examiner's analysis appears to be based on the belief that "product-by-process" limitations can be completely ignored. This, however, would be an incorrect reading of the case law. For example, as stated by the Court in In re Luck, "it is well established that product claims may include process steps to wholly or partially define the claimed product."² For example, in considering whether the product-by-process limitation could be material to patentability, the Court stated: "[t]he method of application could well result in a difference in the coated article."

As a general matter, most materials structurally differ depending upon how the material was fabricated. For example, the microstructure of a metal bar differs depending upon if the bar was formed by forging, casting, powder metallurgy, extrusion, milling, or grinding. As another example, a process, such as heat treating, changes the structure of a material such that the material has very different properties after heat treatment, as compared to the properties of the

material prior to heat treatment. This all occurs without changing the composition of the material. Thus, a claimed product (i.e., using a product-by process limitation) formed by a process not disclosed by the applied prior art can produce a structurally differently product than a product formed by the process of the applied prior art.

The Examiner's analysis also runs afoul of the case law discussed in M.P.E.P. § 2113. As stated therein, the Examiner must first provide a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art.³ The Examiner, however, has failed to make any reasoned argument as to why the claimed steel material formed by carburizing or carbonitriding process, followed by quenching and tempering at a temperature between 200°C and 350°C. Thus, even though the Examiner may have a reduced burden of proof with regard to product by process limitations, the Examiner has yet to meet this burden of proof. Therefore, the Examiner has legally failed to meet the requirements established by the case law and M.P.E.P. § 2113 regarding product-by-process limitations.

**Claim 4 is rejected under 35 U.S.C. § 103 for obviousness predicated upon
Matsumoto et al., U.S. Patent No. 5,997,661 (hereinafter Matsumoto), in view of Kiuchi**

In the fourth enumerated paragraph of the Office Action, the Examiner asserted that the elemental constituents recited in methodology claim 4 are disclosed by Matsumoto in view of Kiuchi.

² 177 USPQ 523 (CCPA 1973)

³ "Once the examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with

As previously described discussed with regard to claim 1, it is an object of Kiuchi to have Cr at a content (3% to 18%), which is even higher than the Cr content (0.3% to 2.5%) of the present invention. Thus, Kiuchi teaches away from the claimed invention.

In Matsumoto, to improve durability of a water bearing used in an environment in which water enters to a lubricant, copper is used in the bearing material. In the present invention, however, copper is not used in the bearing material. Furthermore, in the composition of Matsumoto, Ti is not included. In contrast, Ti is contained up to the content of 0.003% in the composition of the present invention. Ti has an effect of making finer the crystal grains by forming TiC. Therefore, not adding Ti, as disclosed by Matsumoto, is not preferred. Furthermore, although not apparently recognized by the Examiner, the compositions of comparative steel F of Table 1 and sample T of Table 2 of Matsumoto are similar to the claimed composition of claim 1. However, these compositions do not contain Ti.

As Kiuchi teaches away from the claimed invention and Matsumoto fails to teach critical elements of the claimed invention, Applicants respectfully submit that one having ordinary skill in the art would not have considered the claimed invention as a whole to be obvious within the meaning of 35 U.S.C. § 103. Thus, Applicants solicit the withdrawal of the imposed rejection of claim 4 under 35 U.S.C. § 103 for obviousness predicated upon Matsumoto in view of Kiuchi.

evidence establishing an unobvious difference between the claimed product and the prior art product." M.P.E.P. § 2113 (citing In re Marosi, 218 USPQ 289 (Fed. Cir. 1983)).

Claim 5 is rejected under 35 U.S.C. § 103 for obviousness predicated upon Matsumoto in view of Kiuchi and further in view of Okayama et al., U.S. Patent No. 6,306,277 (hereinafter Okayama)

In the fifth enumerated paragraph of the Office Action, the Examiner asserted that the combination of Matsumoto in view of Kiuchi and Okayama discloses the claimed invention. This rejection is traversed.

Claim 5 depends ultimately from independent claim 4, and Applicants incorporate herein the arguments previously advanced in traversing the imposed rejection of claim 4 under 35 U.S.C. § 103 for obviousness predicated upon Matsumoto in view of Kiuchi. The tertiary reference to Okayama does not cure Kiuchi teaching away from the claimed invention, as Okayama does not consider heat resistance, the silicon content of Okayama is not higher than 0.3% and contains nickel, and there is no description in Okayama that a change in texture or degradation in hardness is suppressed at high temperatures. Accordingly, one having ordinary skill in the art would not have found the claimed invention, as recited in claim 5, obvious. Applicants, therefore, respectfully submit that the imposed rejection of claim 5 under 35 U.S.C. § 103 for obviousness predicated upon Matsumoto in view of Kiuchi and Okayama is not viable and, hence, solicit withdrawal thereof.

Claims 6 and 7 are rejected under 35 U.S.C. § 103 for obviousness predicated upon Matsumoto in view of Kiuchi and Okayama and further in view of Hengerer et al., U.S. Patent No. 4,913,749

In the sixth enumerated paragraph of the Office Action, the Examiner asserted that the combination of Matsumoto in view of Kiuchi, Okayama and Hengerer discloses the claimed invention. This rejection is traversed.

Claims 6 and 7 depend ultimately from independent claim 4, and Applicants incorporate herein the arguments previously advanced in traversing the imposed rejection of claim 4 under 35 U.S.C. § 103 for obviousness predicated upon Matsumoto in view of Kiuchi. The additional reference to Hengerer does not cure Kiuchi teaching away from the claimed invention, as Hengerer is not related to heat resistance, but instead related to a technique of releasing hydrogen gas, which has been entrapped in a carburized layer during a carburization process. Accordingly, one having ordinary skill in the art would not have found the claimed invention, as recited in claims 6 and 7, obvious. Applicants, therefore, respectfully submit that the imposed rejection of claims 6 and 7 under 35 U.S.C. § 103 for obviousness predicated upon Matsumoto in view of Kiuchi, Okayama and Hengerer is not viable and, hence, solicit withdrawal thereof.

Applicants have made every effort to present claims which distinguish over the prior art, and it is believed that all claims are in condition for allowance. However, Applicants invite the Examiner to call the undersigned if it is believed that a telephonic interview would expedite the prosecution of the application to an allowance. Accordingly, and in view of the foregoing remarks, Applicants hereby respectfully request reconsideration and prompt allowance of the pending claims.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417, and please credit any excess fees to such deposit account.

Respectfully submitted,

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